US 20250185717A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2025/0185717 A1**

(43) **Pub. Date: Jun. 12, 2025**

Wright

(54) **AEROSOL GENERATING DEVICE COMPRISING LEAKAGE PREVENTING MEANS AND ASSOCIATED AEROSOL GENERATING ASSEMBLY**

(71) Applicant: **JT International SA**, Geneva (CH)

(72) Inventor: **Alec Wright**, Guildford (GB)

(73) Assignee: **JT International SA**, Geneva (CH)

(21) Appl. No.: **18/842,300**

(22) PCT Filed: **Mar. 1, 2023**

(86) PCT No.: **PCT/EP2023/055200**

§ 371 (c)(1),
(2) Date: **Aug. 28, 2024**

(30) **Foreign Application Priority Data**

Mar. 2, 2022 (EP) 22159733.9

Publication Classification

(51) **Int. Cl.**

A24F 40/485	(2020.01)
A24D 1/20	(2020.01)
A24F 7/00	(2006.01)
A24F 40/20	(2020.01)
F16K 15/14	(2006.01)
H05B 3/02	(2006.01)

(52) **U.S. Cl.**

CPC ***A24F 40/485*** (2020.01); ***A24D 1/20*** (2020.01); ***A24F 7/00*** (2013.01); ***A24F 40/20*** (2020.01); ***F16K 15/147*** (2013.01); ***H05B 3/02*** (2013.01)

(57) **ABSTRACT**

An aerosol generating device is configured to operate with a tobacco article including a substrate portion. The device includes a device body including a heating chamber configured to receive the substrate portion and defining an opening, a mouthpiece fixed on the device body and forming an inner volume between a fixing end and an inner surface of the mouthpiece, the mouthpiece being configured to be engaged with a mouthpiece portion of the tobacco article and defining at least one airflow inlet on its internal surface in fluid communication with the closed end of the heating chamber, and leakage preventing means preventing flow leakage from the inner volume via the airflow inlet.

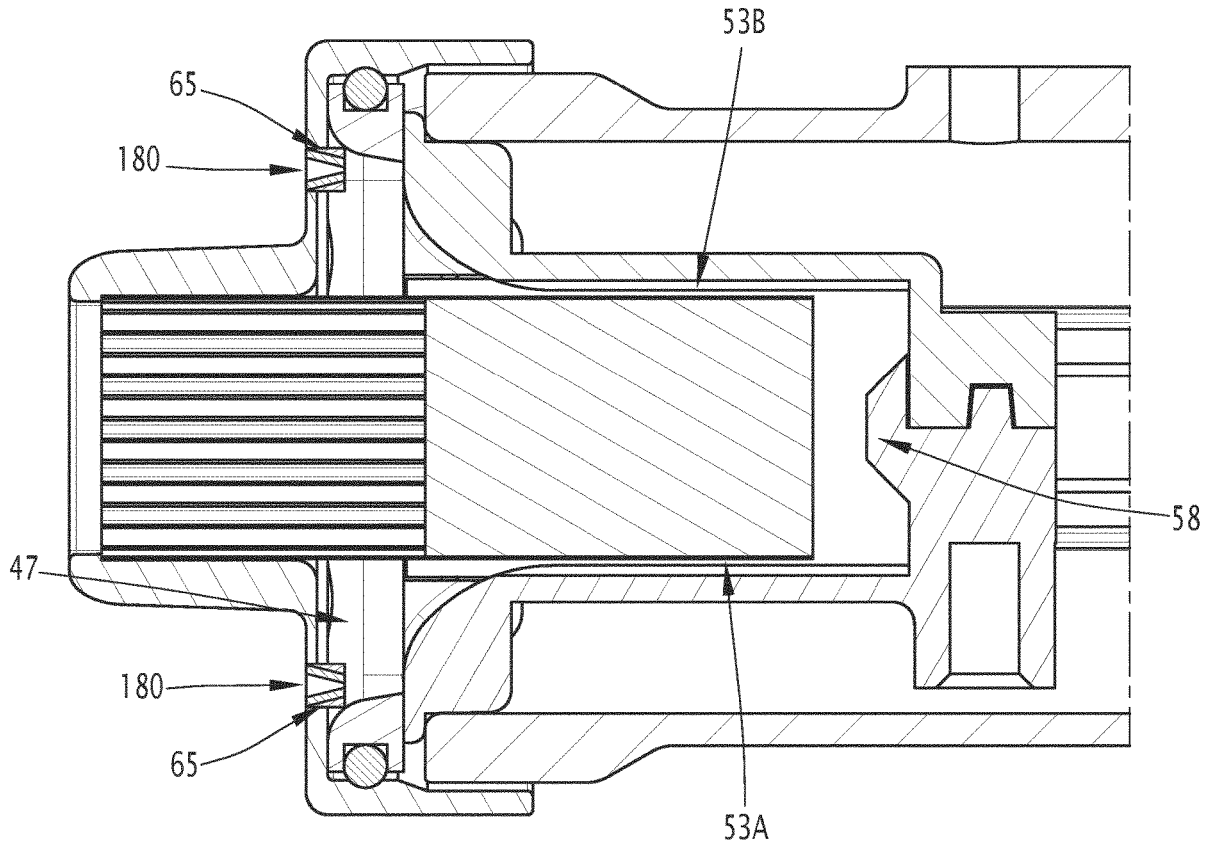
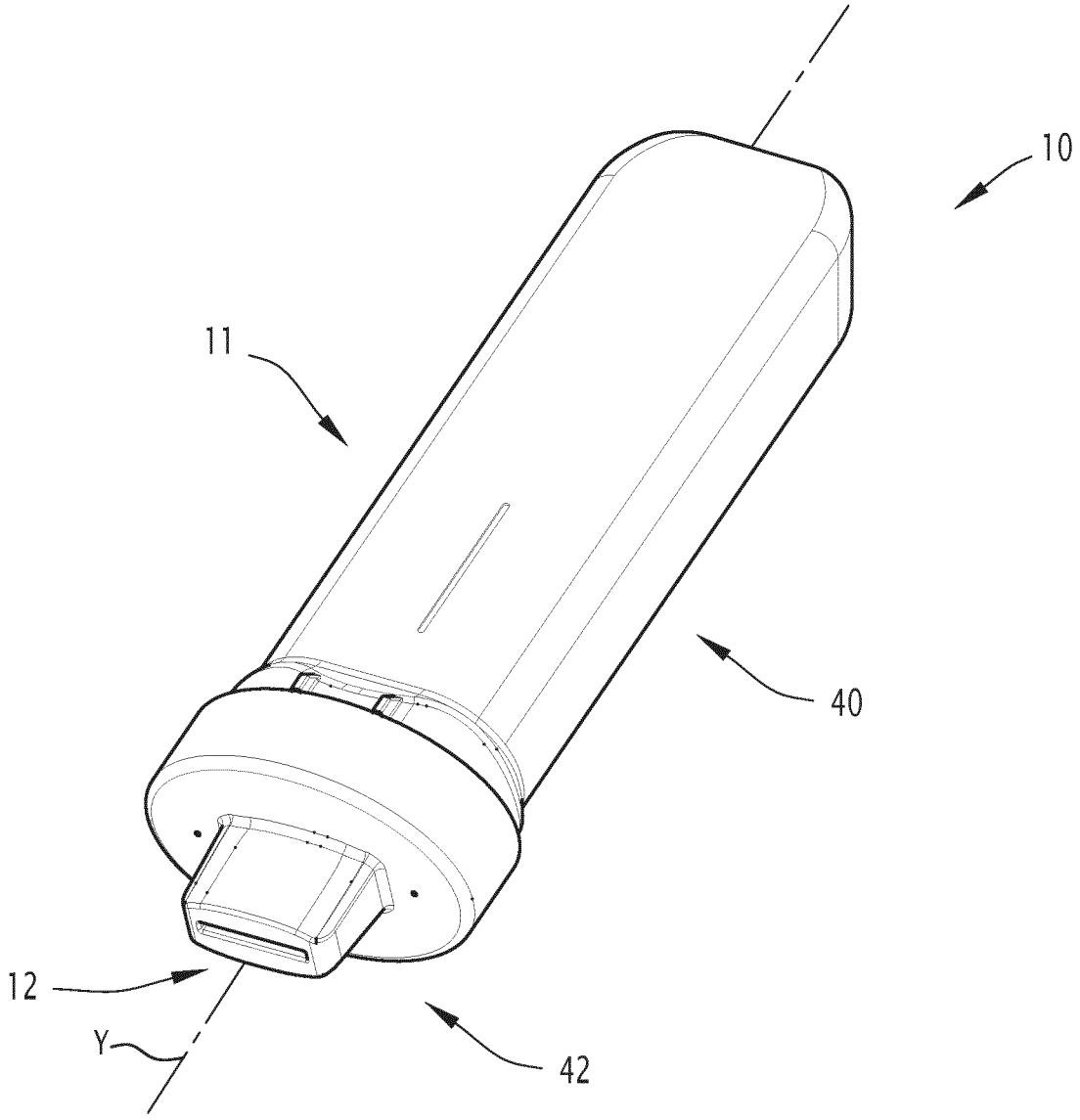


FIG.1



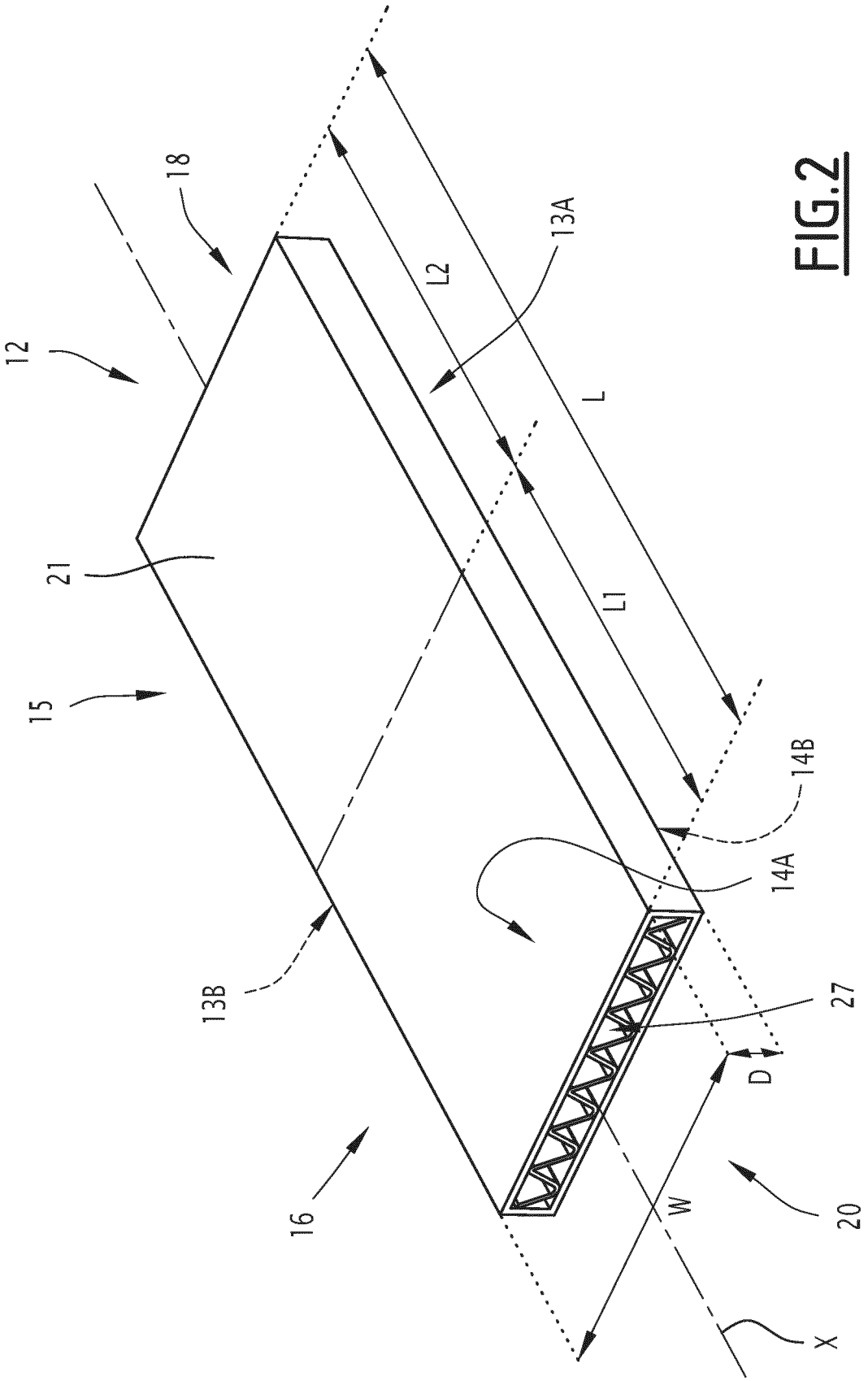


FIG.2

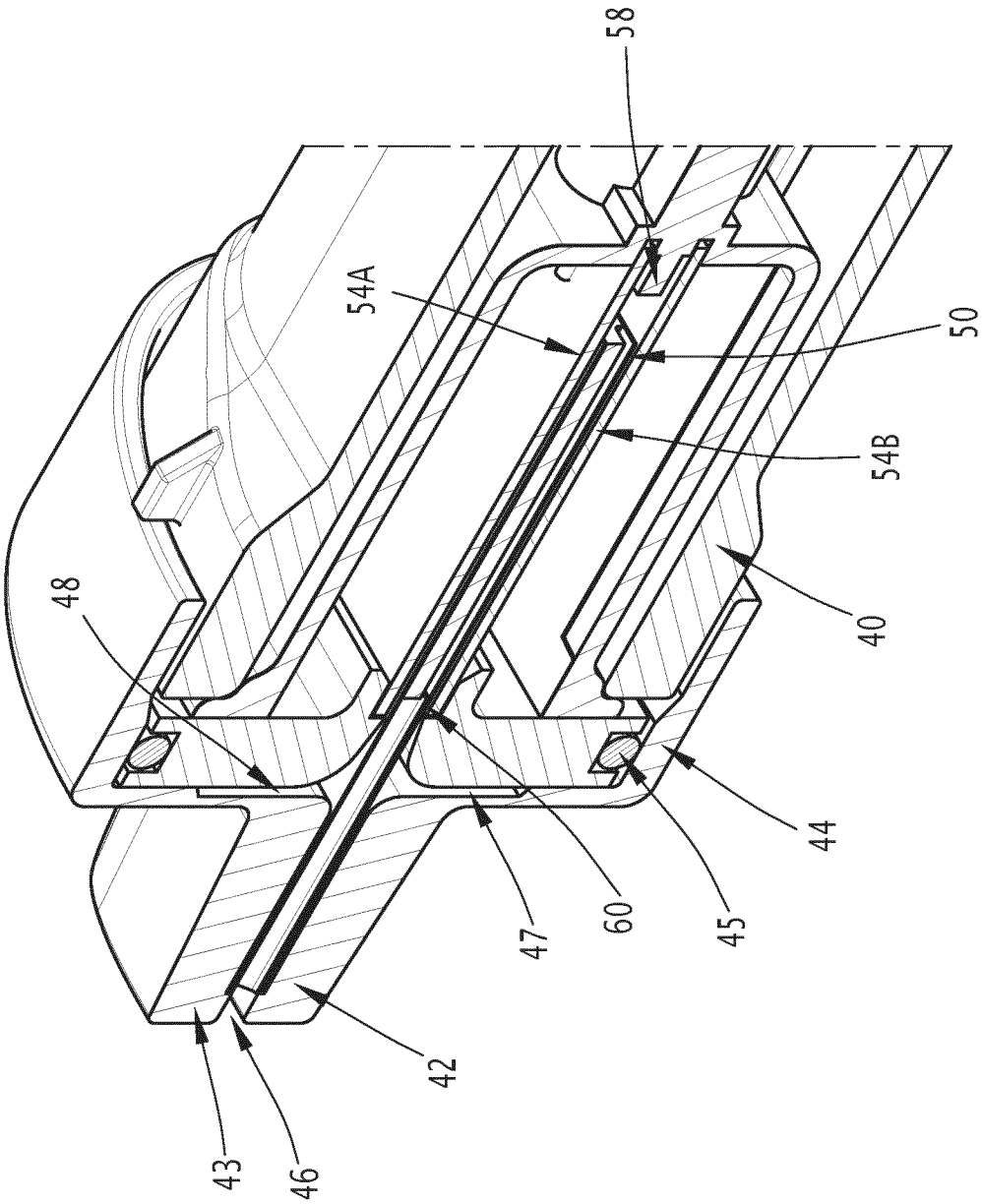


FIG.3

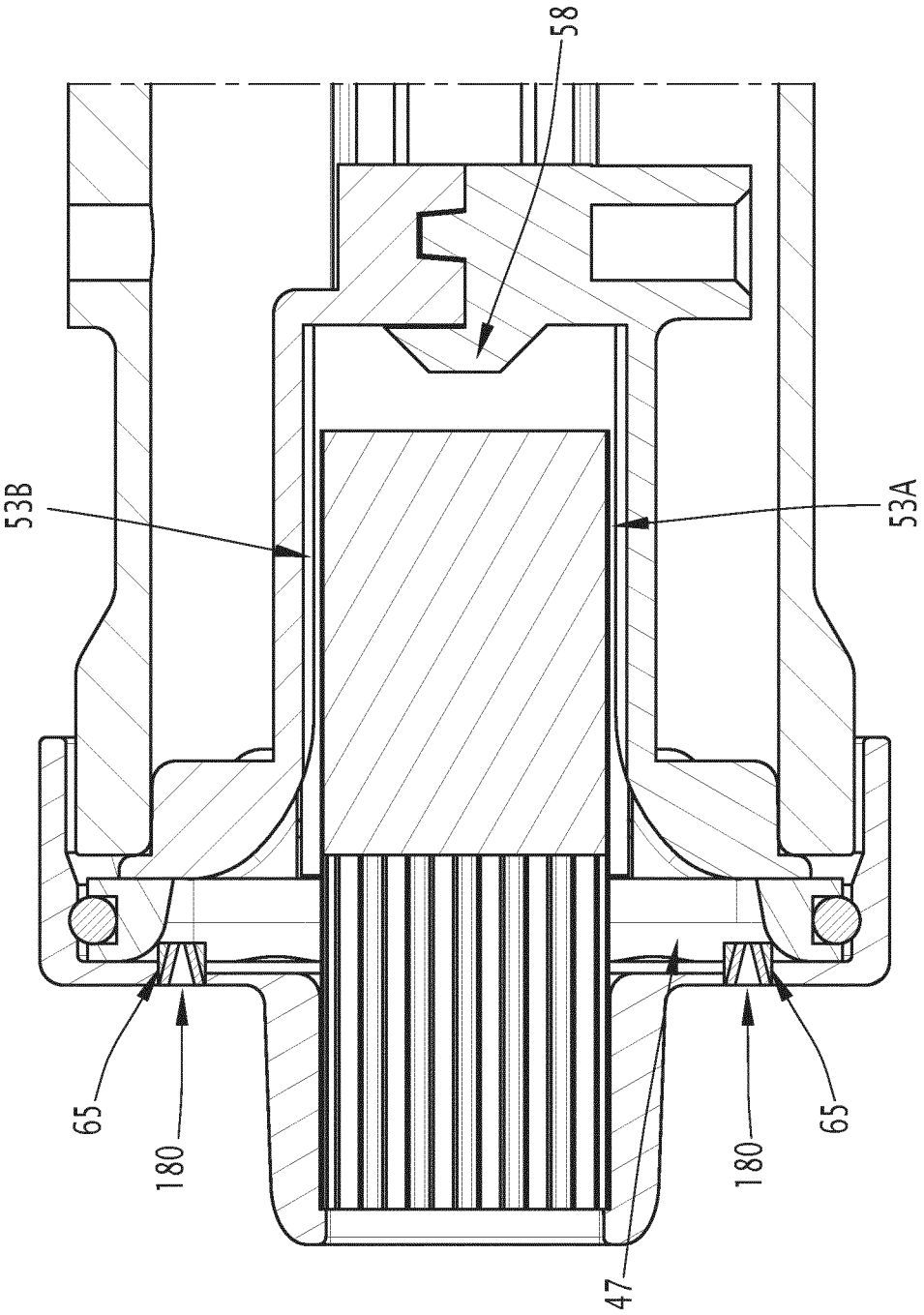


FIG.4

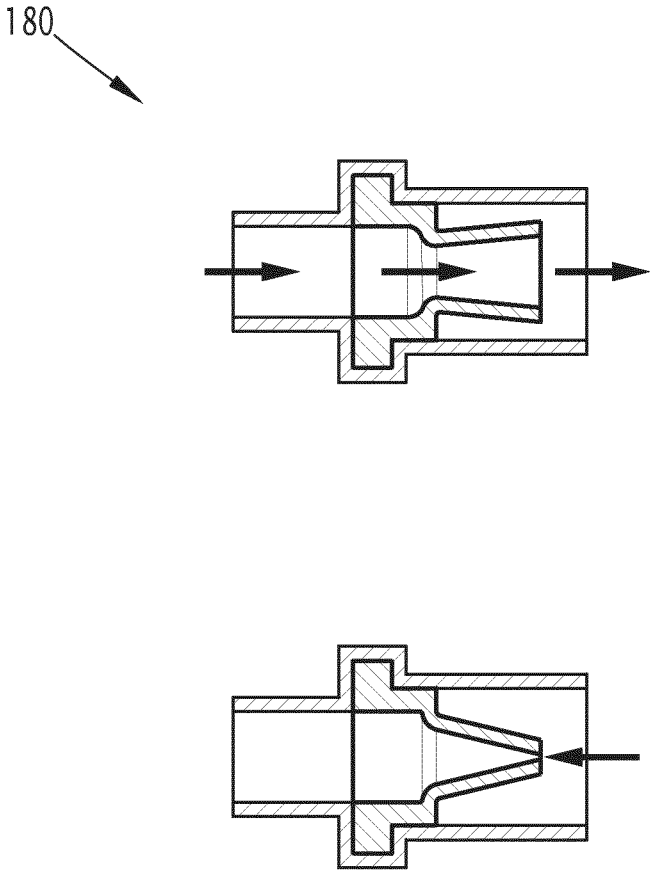


FIG.5

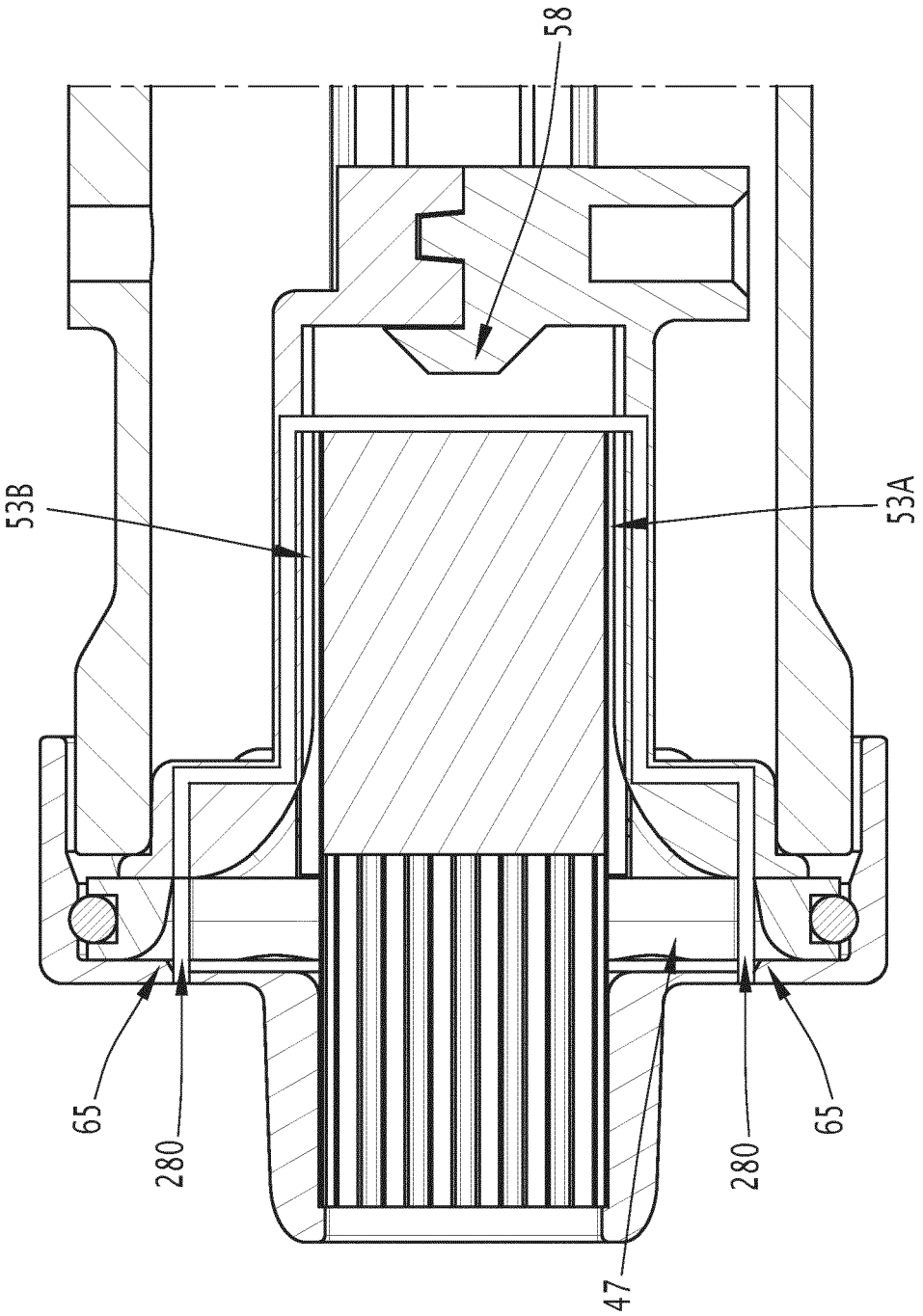


FIG.6

AEROSOL GENERATING DEVICE COMPRISING LEAKAGE PREVENTING MEANS AND ASSOCIATED AEROSOL GENERATING ASSEMBLY

FIELD OF THE INVENTION

[0001] The present invention concerns an aerosol generating device comprising leakage preventing means.

[0002] Particularly, the aerosol generating device according to the invention is configured to operate with a tobacco article, for example a flat-shaped tobacco article, which comprises for example a solid substrate able to form aerosol when being heated. Thus, such type of aerosol generating devices, also known as heat-not-burn devices, is adapted to heat, rather than burn, the substrate by conduction, convection and/or radiation, to generate aerosol for inhalation.

[0003] The present invention also concerns an aerosol generating assembly associated to such a device.

BACKGROUND OF THE INVENTION

[0004] The popularity and use of reduced-risk or modified-risk devices (also known as vaporisers) has grown rapidly in the past few years as an aid to assist habitual smokers wishing to quit smoking traditional tobacco products such as cigarettes, cigars, cigarillos, and rolling tobacco. Various devices and systems are available that heat or warm vaporizable substances as opposed to burning tobacco in conventional tobacco products.

[0005] A commonly available reduced-risk or modified-risk device is the heated substrate aerosol generation device or heat-not-burn device. Devices of this type generate aerosol or vapour by heating an aerosol substrate that typically comprises moist leaf tobacco or other suitable vaporizable material to a temperature typically in the range 150° C. to 350° C. Heating an aerosol substrate, but not combusting or burning it, releases aerosol that comprises the components sought by the user but not the toxic and carcinogenic by-products of combustion and burning. Furthermore, the aerosol produced by heating the tobacco or other vaporizable material does not typically comprise the burnt or bitter taste resulting from combustion and burning that can be unpleasant for the user and so the substrate does not therefore require the sugars and other additives that are typically added to such materials to make the smoke and/or vapour more palatable for the user.

[0006] Tobacco articles, usable with such type of aerosol generating devices can take various forms. Some of them can present an elongated stick or any other suitable shape, like for example a flat shape. However, design of a tobacco article is often a trade-off between its aesthetics and efficiency in heating.

[0007] Some of known aerosol generating devices operating with solid tobacco substrates produce a high level of vapour in the substrate portion. In the current design, the vapour does not all go through the designed path including the mouthpiece portion of the article but instead can leak back up and out of the device, which reduces the overall vapour efficiency.

SUMMARY OF THE INVENTION

[0008] One of the aims of the invention is to provide an aerosol generating device with increased vapour efficiency.

[0009] For this purpose, the invention relates to an aerosol generating device configured to operate with a tobacco article comprising a substrate portion and a mouthpiece portion arranged successively along an article axis, the aerosol generating device comprising:

[0010] a device body along a device axis from a fixing end, and comprising a heating chamber configured to receive the substrate portion of the tobacco article and defining an opening adjacent to the fixing end of the device body and a closed end opposite to the opening according to the device axis;

[0011] a mouthpiece fixed on the fixing end of the device body and forming an inner volume between this fixing end and an inner surface of the mouthpiece, the mouthpiece being configured to be engaged with the mouthpiece portion of the tobacco article and defining at least one airflow inlet on its internal surface in fluid communication with the closed end of the heating chamber.

[0012] The aerosol generating device further comprises leakage preventing means preventing flow leakage from the inner volume via the airflow inlet.

[0013] Thanks to these features, it is possible to avoid flow leakage from the inner volume of the mouthpiece and thus, increase the overall vapour efficiency of the device. Particularly, it was observed that in the devices defining an inner volume under the mouthpiece, a backward flow may be created during the user puffs and the flow can exist the device from the airflow inlet. The leakage preventing means according to the invention prevents such a situation and thus, improve the overall vapour efficiency of the device.

[0014] According to some embodiments, the leakage preventing means comprise a valve arranged in the airflow inlet.

[0015] According to some embodiments, the valve is configured to be opened while user puffs and closed in absence of user puffs.

[0016] Thanks to these features, it is possible to prevent in a simple and non-expensive way flow leakages from the airflow inlet. The valve forms thus a one-way fluidic valve which allows air entering into the device when the user takes a puff but prevents vapour from leaking back outwards.

[0017] According to some embodiments, the valve opens directly to the inner volume.

[0018] Thanks to these features, the airflow can be easily guided until the heating chamber. Additionally, in some cases, the entering airflow can be in contact with the tobacco article, for example with the mouthpiece portion of the tobacco article. This can cool down this mouthpiece portion and improve the user's perception of the inhaled flow.

[0019] According to some embodiments, the valve is a duck bill valve.

[0020] A duck bill valve is the preferred valve of choice as it can be made in a small size and is simple to implement. Other types like a conventional spring assisted check valve could also be used.

[0021] According to some embodiments, an airflow channel is formed between the airflow inlet and the closed end of the heating chamber, the airflow channel being formed by an upstream portion extending from the airflow inlet through the inner volume and a downstream portion extending from the upstream portion until the closed end of the heating chamber.

[0022] Thanks to these feature, air from the outside of the device can be guided until the closed end of the heating

chamber. Then, air passes inside the tobacco article first in the substrate portion and then, in the mouthpiece portion. After the mouthpiece portion, the flow is inhaled directly by the user.

[0023] According to some embodiments, the downstream portion of the airflow channel extends outside or inside the heating chamber.

[0024] According to some embodiments, the downstream portion of the airflow channel extends along a lateral wall of the heating chamber.

[0025] When the downstream portion extends inside the heating chamber, it can extend from the opening until the closed end of the heating chamber. It can for example extend between a wall of the heating chamber and a wall of the tobacco article. For this purpose, the cross-section of the heating chamber may have at least one dimension which is greater than the corresponding dimension of the cross-section of the tobacco article.

[0026] When the downstream portion extends outside the heating chamber, it can extend along for example at least one wall of the heating chamber, such as a lateral wall (called also narrow wall in the specification) and open at the closed end of the heating chamber. This improves the amount of air pulled through the substrate portion decreasing the importance of the fit of the consumable in the heating chamber. This also gives a more consistent pressure drop from one tobacco article to another.

[0027] According to some embodiments, the leakage preventing means comprise a bypass channel forming the upstream portion of the airflow channel, the bypass channel being fluidically isolated from the inner volume.

[0028] Thanks to these features, it is possible to isolate the inner volume of the mouthpiece from the airflow inlet. Thus, a backward flow in the vicinity of the airflow inlet can be avoided. According to this embodiment, the airflow inlet can be provided with or without a valve as explained above. Particularly, when no valve is provided, a backward flow is avoided only due to the bypass channel. When a valve is provided, a backward flow is avoided using both elements, valve and bypass channel.

[0029] According to some embodiments, at least a portion of the bypass channel is delimited by a tube extending through the inner volume.

[0030] Thanks to these features, the bypass channel can be easily implemented in order to be isolated from the inner volume.

[0031] According to some embodiments, the mouthpiece defines at least two airflow inlets on its internal surface in fluid communication with the closed end of the heating chamber; the aerosol generating device comprising leakage preventing means for each airflow inlet.

[0032] Thanks to these features, it is possible to ensure a greater quantity of airflow passing through the tobacco article. The airflow inlets can be provided with the same leakage preventing means or with different leakage preventing means. For example, at least one airflow inlet can be provided with a valve as explained above and at least one airflow inlet can be provided with a bypass channel as explained above. According to another embodiment, each airflow inlet is provided with a valve as explained above or with a bypass channel as explained above.

[0033] According to some embodiments the mouthpiece defines a through hole configured to be engaged with the mouthpiece portion of the tobacco article.

[0034] Thanks to these features, the through hole can be adapted to tightly fit the tobacco article and thus to avoid or minimise flow leakage between the mouthpiece and the tobacco article. Additionally, the through hole can be adapted to maintain the tobacco article while for example its extraction from the device and/or insertion inside the device. Additionally, in some cases, the mouthpiece can also be adapted to maintain the tobacco article in the heating chamber with a distance from the heating walls. Thus, it is possible to ensure heating of the tobacco article by convection instead of conduction for example.

[0035] According to some embodiments, said airflow inlets are arranged on different sides of the through hole.

[0036] The airflow inlets can for example be arranged symmetrically in respect with the through-hole. Additionally, the leakage preventing means can also be arranged symmetrically in respect with the through-hole.

[0037] According to some embodiments, configured to operate with a flat-shaped tobacco article.

[0038] Thanks to these features, the tobacco article can be easily heated while being compact and easily handled by the user.

[0039] The invention also relates to an aerosol generating assembly comprising a tobacco article and an aerosol generating device as defined above, configured to operate with the tobacco article.

BRIEF DESCRIPTION OF THE DRAWINGS

[0040] The invention and its advantages will be better understood upon reading the following description, which is given solely by way of non-limiting example and which is made with reference to the appended drawings, in which:

[0041] FIG. **1** is a perspective view of an aerosol generating assembly according to the invention, the aerosol generating assembly comprising an aerosol generating device according to the invention and a tobacco article usable with the aerosol generating device;

[0042] FIG. **2** is a perspective view of the tobacco article of FIG. **1**;

[0043] FIG. **3** is a partial cross-sectional view of the aerosol generating assembly of FIG. **1** according to a longitudinal vertical plane of this FIG. **1**;

[0044] FIG. **4** is a partial cross-sectional view of the aerosol generating assembly of FIG. **1** according to a longitudinal horizontal plane of this FIG. **1**, the aerosol generating device comprising leakage preventing means according to a first embodiment of the invention;

[0045] FIG. **5** is a detailed view illustrating the operation of the leakage preventing means of FIG. **4**; and

[0046] FIG. **6** is a partial cross-sectional view similar to the view of FIG. **4**, the aerosol generating device comprising leakage preventing means according to a second embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0047] Before describing the invention, it is to be understood that it is not limited to the details of construction set forth in the following description. It will be apparent to those skilled in the art having the benefit of the present disclosure that the invention is capable of other embodiments and of being practiced or being carried out in various ways.

[0048] As used herein, the term "aerosol generating device" or "device" may include a vaping device to deliver an aerosol to a user, including an aerosol for vaping, by means of a heater element explained in further detail below. The device may be portable. "Portable" may refer to the device being for use when held by a user. The device may be adapted to generate a variable amount of aerosol, e.g. by activating the heater element for a variable amount of time (as opposed to a metered dose of aerosol), which can be controlled by a trigger. The trigger may be user activated, such as a vaping button and/or inhalation sensor. The inhalation sensor may be sensitive to the strength of inhalation as well as the duration of inhalation to enable a variable amount of vapour to be provided (so as to mimic the effect of smoking a conventional combustible smoking article such as a cigarette, cigar or pipe, etc.). The device may include a temperature regulation control to drive the temperature of the heater and/or the heated aerosol generating substance (aerosol pre-cursor) to a specified target temperature and thereafter to maintain the temperature at the target temperature that enables efficient generation of aerosol.

[0049] As used herein, the term "aerosol" may include a suspension of vaporizable material as one or more of: solid particles; liquid droplets; gas. Said suspension may be in a gas including air. Aerosol herein may generally refer to/include a vapour. Aerosol may include one or more components of the vaporizable material.

[0050] As used herein, the term "vaporizable material" or "precursor" may refer to a smokable material which may for example comprise nicotine or tobacco and an aerosol former. Tobacco may take the form of various materials such as shredded tobacco, granulated tobacco, tobacco leaf and/or reconstituted tobacco. Suitable aerosol formers include: a polyol such as sorbitol, glycerol, and glycols like propylene glycol or triethylene glycol; a non-polyol such as monohydric alcohols, acids such as lactic acid, glycerol derivatives, esters such as triacetin, triethylene glycol diacetate, triethyl citrate, glycerin or vegetable glycerin. In some embodiments, the aerosol generating agent may be glycerol, propylene glycol, or a mixture of glycerol and propylene glycol. The substrate may also comprise at least one of a gelling agent, a binding agent, a stabilizing agent, and a humectant.

[0051] FIG. **1** shows an aerosol generating assembly **10** comprising an aerosol generating device **11** and a tobacco article **12**. The aerosol generating device **11** is intended to operate with the tobacco article **12** which is shown in more detail in FIGS. **2**.

[0052] In the example of this FIG. **2**, the tobacco article **12** is a flat-shaped tobacco article presenting for example a flat-shaped cuboid extending along an article axis X and having external dimensions L×W×D. In a typical example, the length L of the article **12** according to the article axis X equals substantially to 33 mm while its width W and depth D are substantially equal respectively to 12 mm and 1.2 mm. According to different examples, the values L, W and D can be selected within a range of +/−40%, for example. The depth D of the tobacco article **12** is formed by a pair of parallel walls **13**A, **13**B, called hereinafter narrow walls **13**A, **13**B, and the width W of the substrate is formed by a pair of parallel walls **14**A, **14**B, called hereinafter wide walls **14**A, **14**B. In some embodiments, the edges between the wide and narrow walls **13**A, **13**B, **14**A, **14**B can be rounded. According to other embodiments of the invention, the tobacco article **12** can have any other suitable flat shape and/or external dimensions. According to still other embodiments, the tobacco article **12** can present any other suitable shape, as for example a stick shape.

[0053] The tobacco article **12** comprises a substrate portion **15** and a mouthpiece portion **16** arranged along the article axis X. The substrate portion **15** may for example be slightly longer than the mouthpiece portion **16**. For example, the length L**2** of the substrate portion **15** according to the article axis X may be substantially equal to 18 mm and the length L**1** of the mouthpiece portion **16** according to the article axis X may be substantially equal to 15 mm. The substrate portion **15** defines an abutting end **18** of the article **12** and the mouthpiece portion **16** defines a mouth end **20** of the article **12**. The substrate portion **15** and the mouthpiece portion **16** may be fixed one to the other by a wrapper **21** extending around the substrate axis X. The wrapper **21** forms the narrow and wide walls **13**A, **13**B, **14**A, **14**B of the tobacco article **12**. In some embodiments, the wrapper **21** is formed from a same wrapping sheet. In some other embodiments, the wrapper **21** is formed by separate wrapping sheets wrapping separately the portions **15**, **16** and fixed one to the other by any other suitable mean. The wrapper **21** may, for example, comprise paper and/or non-woven fabric and/or aluminium foil. The wrapper **21** may be porous or air impermeable and forms a plurality of airflow channels extending inside the article **12** between the abutting end **18** and the mouth end **20**.

[0054] The mouthpiece portion **16** comprises a core **27** intended to act for example as a cooler to cool slightly the vapour before it is inhaled by the user. The core **27** may comprise for this purpose for example corrugated paper. The core **27** may be formed through an extrusion and/or rolling process into a stable shape. Advantageously, the core **27** is arranged inside the mouthpiece portion **16** to be entirely in contact with the internal surface of the wrapper **21** delimiting this mouthpiece portion **16**.

[0055] The substrate portion **15** comprises a vaporizable material and is intended to be heated by a heating chamber, as it will be explained in further detail below.

[0056] Referring again to FIG. **1**, the aerosol generating device **11** comprises a device body **40** extending along a device axis Y and a mouthpiece **42**. According to the example described below, the mouthpiece **42** and the device body **40** form two different pieces. Particularly, according to this example, the mouthpiece **42** is designed to be fixed on a fixing end of the device body **40**.

[0057] As it is shown in FIG. **3**, the mouthpiece **42** comprises a central part **43** and a peripheral part **44** extending around the central part **43**. The peripheral part **44** defines for example a collar covering partially an external surface of the device body **40** when the mouthpiece **42** is fixed on the fixing end of the device body **40**. For example, the peripheral part **44** can be designed to cooperate with a gasket **45** arranged on the fixing end of the device body **40** in order to seal the space formed between the peripheral part **44** and the external surface of the device body **40**. The peripheral part **44** also defines an intermediate portion extending for example transversally to the device axis Y et forming a transition between the central part **43** of the mouthpiece **42** and the collar defined by the peripheral part **44**. The central part **43** of the mouthpiece **42** defines a through hole **46** adapted to receive at least partially the tobacco article **12**. Particularly, the through hole **46** can be adapted to receive

at least a part of the mouthpiece portion **16** of the tobacco article **12** as it is shown in FIG. **3**. Advantageously, the through hole **46** can be adapted to fit tightly the mouthpiece portion **16** of the tobacco article **12** so as to avoid or minimise flow leakage between a wall delimiting the through hole **46** and an external surface of the tobacco article **12**. In some embodiments, the tobacco article **12** can be retained for example by friction in the through hole **46**. In this case, it is possible for example to insert first the mouthpiece portion **16** of the tobacco article **12** inside the through hole **46** and when fix both elements on the fixing end of the device body **40**.

[0058] As it is also shown in FIG. **3**, an inner volume **47** is formed between an inner surface **48** of the mouthpiece **42** and the fixing end of the device body **40**. This inner volume **47** is crossed by the tobacco article **12** when it is inserted inside the device body **40**. For example, the tobacco article **12** can divide the inner volume **47** in two symmetric parts.

[0059] The device body **40** delimits an internal space of the device **11** receiving various elements designed to carry out different functionalities of the device **11**. This internal space can for example receive a battery for powering the device **11**, a control module for controlling the operation of the device **11**, a heating chamber **50** for heating the substrate portion **15** of the tobacco article **12**, etc. Among these elements, only the heating chamber **50** will be explained in further detail in reference to FIG. **3**.

[0060] Particularly, as it is shown in this FIG. **3**, the heating chamber **50** can form a cup shape adapted to receive at least the substrate portion **15** of the tobacco article **12** and in some cases, at least a part of the mouthpiece portion **16**. As the tobacco article **12**, the heating chamber **50** may also form a cuboid shape extending along the device axis Y and comprising a pair of parallel narrow walls **53**A, **53**B (shown in FIGS. **4** and **6**) extending along the device axis Y, a pair of parallel wide walls **54**A, **54**B extending also along the device axis Y and a bottom wall **58** adjacent to each of said walls and extending perpendicularly to the device axis Y. The bottom wall **58** forms thus a closed end of the chamber **50**. Opposite to the bottom wall **58**, the heating chamber **50** defines an opening **60** configured to receive the tobacco article **12** so as the corresponding wide walls **14**A, **14**B of the tobacco article **12** face the corresponding wide walls **54**A, **54**B of the heating chamber **50**, the corresponding narrow walls **13**A, **13**B of the tobacco article **12** face the corresponding narrow walls **53**A, **53**B of the heating chamber **50** and the abutting end **18** of the tobacco article **12** abuts against the bottom wall **58** or at least a rib extending from this bottom wall **58**. Alternatively, the abutting end **18** faces the bottom wall **58** without being in contact with it. The heating chamber **50** is thus configured to receive the tobacco article **12** so as the narrow wall **13**A (respectfully **13**B) of the tobacco article **12** faces the narrow wall **53**B (respectfully **53**A) of the heating chamber **50**, and the wide wall **14**A (respectfully **14**B) of the tobacco article **12** faces the wide wall **54**B (respectfully **54**A) of the heating chamber **50**. The facing wide walls **14**A, **14**B, **54**A, **54**B and the facing narrow walls **13**A, **13**B, **53**A, **53**B can be in contact one with the other or spaced one from the other.

[0061] The heating chamber **50** further comprises one or several heating elements (not-shown) arranged to heat the substrate portion **15** of the tobacco article **12**. According to different embodiments of the invention, the or each heating element can present for example a restive element arranged adjacent to at least one of the walls **53**A, **53**B, **54**A, **54**B of the heating chamber **50**. Advantageously, a resistive heating element, as for example a heating track or a polyimide film heater, is arranged adjacent to each wide wall **54**A, **54**B of the heating chamber **50**, for example on an external surface of such a wall. According to other embodiments of the invention, the or each heating element presents any other suitable mean, as for example a heating blade penetrating the substrate portion **15** of the tobacco article **12**. According to still another embodiment, the or each heating element presents a magnetic element able to cause heating of a plurality of susceptors comprised in the substrate portion **15** by magnetic induction.

[0062] In order to ensure user's puffs, an airflow channel extending from an airflow inlet **65** (shown in FIGS. **4** and **6**) until the closed end of the heating chamber **50** is formed inside the aerosol generating device **11**. Thus, air can enter the heating chamber **50** through the airflow channel and pass first to the substrate portion **15** and then through the mouthpiece portion **16** of the tobacco article **12** before being delivered to the user. According to the invention, the airflow inlet **65** is arranged in the mouthpiece **42**, advantageously in the intermediate portion of the peripheral part **44** of this mouthpiece **42**. The airflow inlet **65** can be formed by a through hole.

[0063] The airflow channel is formed by an upstream portion extending from the airflow inlet **65** and a downstream portion extending from the upstream portion until the closed end of the heating chamber **50**. According to different embodiments of the invention, the downstream portion may extend inside or outside the heating chamber **50**. For example, according to one embodiment, the downstream portion extends inside the heating chamber **50** from its opening **60** until the closed end. In this case, the downstream portion can be formed between a narrow wall **13**A, **13**B of the tobacco article **12** and the corresponding narrow wall **53**A, **53**B of the heating chamber **50**. According to another embodiment, the downstream portion extends outside the heating chamber through for example a dedicated channel extending along a narrow wall **53**A, **53**B of the heating chamber **50**. In this case, the downstream portion opens to the closed end of the heating chamber **50**. The arrangement of the upstream portion depends on different embodiments of the invention explained in further detail below.

[0064] In some embodiments, several airflow channels can be formed inside the aerosol generating device **11**, each of these channels being similar to the channel described above. For example, these channels can be arranged symmetrically in respect with the through hole **46** of the mouthpiece **42**. In the example of the Figures, two airflow channels are arranged symmetrically in respect with the through hole **46**.

[0065] According to the invention, the aerosol generating device **11** further comprises leakage preventing means **180**, **280** preventing flow leakage from the inner volume **47**. The implementation of these leakage preventing means **180**, **280** depends on different embodiments of the invention explained in further detail below.

First Embodiment

[0066] The leakage preventing means **180** according to the first embodiment of the invention will now be explained in reference to FIG. **4**.

[0067] According to this embodiment, the leakage preventing means **180** comprise a valve arranged in the or each

airflow inlet **65**. Additionally, according to this embodiment, the or each airflow inlet **65** opens directly to the inner volume **47**. Thus, in this case, the upstream portion of the corresponding airflow channel extends through this inner volume **47**, for example without being delimited inside this volume.

[0068] An example of a valve forming the leakage preventing means **180** is shown in FIG. **5**. According to this example, the valve is a duck bill valve configured to be opened while user puffs (configuration shown in the up part of the Figure) and closed in absence of user puffs (configuration shown in the down part of the Figure). In other words, the valve is configured to be opened upon an airflow occurring from the outside of the device **11** to the inside and closed otherwise.

Second Embodiment

[0069] The leakage preventing means **280** according to the second embodiment of the invention will now be explained in reference to FIG. **6**.

[0070] According to this embodiment, the leakage preventing means **280** comprise a bypass channel extending from the or airflow inlet **60** through the inner volume **47** while being fluidically isolated from the inner volume **47**. The bypass channel forms thus the upstream portion of the corresponding airflow channel. In the preferred embodiment, in this case, the downstream portion of the corresponding airflow channel extends outside the heating chamber **50**.

[0071] According to some examples of the second embodiment, the bypass channel **280** is delimited by a tube extending through the inner volume **47**. According to other examples, the bypass channel **280** is at least partially formed by one or several surfaces delimiting the inner volume **47**.

[0072] The second embodiment can be combined with the first embodiment. In this case, at least one airflow channel can be associated simultaneously with a valve and a bypass channel. According to another example, at least one airflow channel can be associated with a valve and at least one other airflow channel can be associated with a bypass channel.

1. An aerosol generating device configured to operate with a tobacco article comprising a substrate portion and a mouthpiece portion arranged successively along an article axis, the aerosol generating device comprising:

a device body extending along a device axis from a fixing end, and comprising a heating chamber configured to receive the substrate portion of the tobacco article and defining an opening adjacent to the fixing end of the device body and a closed end opposite to the opening according to the device axis;

a mouthpiece fixed on the fixing end of the device body and forming an inner volume between the fixing end and an inner surface of the mouthpiece, the mouthpiece being configured to be engaged with the mouthpiece portion of the tobacco article and defining at least one airflow inlet on the inner surface in fluid communication with the closed end of the heating chamber; and

leakage preventing means preventing flow leakage from the inner volume via the at least one airflow inlet.

2. The aerosol generating device according to claim **1**, wherein the leakage preventing means comprise a valve arranged in at least one inlet of the at least one airflow inlet.

3. The aerosol generating device according to claim **2**, wherein the valve is configured to be opened while a user puffs and closed in the absence of user puffs.

4. The aerosol generating device according to claim **2**, wherein the valve opens directly to the inner volume.

5. The aerosol generating device according to claim **2**, wherein the valve is a duck bill valve.

6. The aerosol generating device according to claim **1**, wherein an airflow channel is formed between one inlet of the at least one airflow inlet (**65**) and the closed end of the heating chamber, the airflow channel being formed by an upstream portion extending from the one airflow inlet through the inner volume and a downstream portion extending from the upstream portion until the closed end of the heating chamber.

7. The aerosol generating device according to claim **6**, wherein the downstream portion of the airflow channel extends outside or inside the heating chamber.

8. The aerosol generating device according to claim **6**, wherein the downstream portion of the airflow channel extends along a lateral wall of the heating chamber.

9. The aerosol generating device according to claim **6**, wherein the leakage preventing means comprise a bypass channel forming the upstream portion of the airflow channel, the bypass channel being fluidically isolated from the inner volume.

10. The aerosol generating device according to claim **9**, wherein at least a portion of the bypass channel is delimited by a tube extending through the inner volume.

11. The aerosol generating device according to claim **1**, wherein the at least one airflow inlet includes at least two airflow inlets on the inner surface in fluid communication with the closed end of the heating chamber;

the aerosol generating device comprising leakage preventing means for each airflow inlet.

12. The aerosol generating device according to claim **1**, wherein the mouthpiece defines a through hole configured to be engaged with the mouthpiece portion of the tobacco article.

13. The aerosol generating device according to claim **11**, wherein inlets of the at least two airflow inlets are arranged on different sides of the through hole.

14. The aerosol generating device according to claim **1**, configured to operate with a flat-shaped tobacco article.

15. An aerosol generating assembly comprising a tobacco article and the aerosol generating device according to claim **1**, configured to operate with the tobacco article.

16. The aerosol generating assembly according to claim **15**, wherein the tobacco article is a flat-shaped tobacco article.

17. An aerosol generating device configured to operate with a tobacco article comprising a substrate portion and a mouthpiece portion arranged successively along an article axis, the aerosol generating device comprising:

a device body extending along a device axis from a fixing end, and comprising a heating chamber configured to receive the substrate portion of the tobacco article and defining an opening adjacent to the fixing end of the device body and a closed end opposite to the opening according to the device axis;

a mouthpiece fixed on the fixing end of the device body and forming an inner volume between the fixing end and an inner surface of the mouthpiece, the mouthpiece being configured to be engaged with the mouthpiece

portion of the tobacco article and defining at least one airflow inlet on the inner surface in fluid communication with the closed end of the heating chamber; and

a valve arranged in at least one inlet of the at least one airflow inlet preventing flow leakage from the inner volume via the at least one airflow inlet.

* * * * *